IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	John Santhoff et al.	Group Art Unit:	2616
		Examiner:	Afsar M. Qureshi
Serial No.:	10/782,134	Confirmation No.:	5198
Filed:	February 18, 2004		
For:	ULTRA – WIDEBAND COMMUNICATION PROTOCOL		

Carlsbad, California
February 22, 2007

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir/Madam:

This brief is submitted under 35 U.S.C. §134 and is in accordance with 37 C.F.R. Parts 1, 5, 10, 11, and 41, effective September 13, 2004 and published at 69 Fed. Reg. 155 (August 2004). A Petition for a three month extension of time accompanies this Appeal Brief, thereby extending the deadline for filing a response to the Office Action mailed August 23, 2006 to February 23, 2007.

Table of Contents

(1) Real Party in Interest

The real party in interest is Pulse-Link, Inc.

(2) Related Appeals/Interferences

No other appeals or interferences exist which relate to the present application or appeal.

(3) Status of Claims

Claims 7-20 are pending and rejected, and claims 1-6 have been withdrawn under a restriction requirement.

(4) Status of Amendments

No amendments are outstanding.

(5) Summary of Claimed Subject Matter

As an initial matter, it is noted that according to the Patent Office, the concise explanations under this section are for Board convenience, and do not supersede what the claims actually state, 69 Fed. Reg. 155 (August 2004), see page 49976. Accordingly, nothing in this Section should be to change (e.g., broaden, narrow) the scope of the claims by the process of claim interpretation, prosecution history estoppel or in any other manner, for purposes of this appeal and/or subsequently to this appeal.

As set forth in independent claims 7 and 16, one embodiment of the invention provides a system for ultra-wideband communication that employs a first data frame that transmits data at a first data rate, a second data frame that transmits data at a second data rate, where both the first and second data frames are transmitted pseudo-randomly. For example, in one embodiment, the first data frame is intended for an ultra-wideband receiver that only needs data transmitted at a low data rate (i.e., the first data rate). The second data frame is intended for an ultra-wideband receiver that needs data transmitted at a high data rate (i.e., the second data rate). To avoid generating clusters of energy at specific frequencies that may cause interference with conventional narrowband receivers, the first data frame and the second data frame are transmitted using a pseudo-random sequence, which eliminates the energy clusters.

This embodiment ultra-wideband communication system as claimed firstly enables

communication between ultra-wideband devices at different data rates, and secondly, enables variable data rate communication while in the presence of conventional narrowband receivers.

As set forth in independent claim 17, a second embodiment of the invention provides an ultra-wideband communication device that includes a transceiver structured to communicate at a first data rate and a transmitter structured to transmit at a second data rate that is greater than the first data rate. That is, the transceiver includes both a transmitter and a receiver that, for example, transmit and receive data at a lower data rate. But the transmitter only transmits data at a higher data rate, and does not include a receiver. This embodiment enables an ultra-wideband communication device to use the lower data rate transceiver to "log on" or otherwise communicate with another device or network, and then transmit data at a higher data rate using the transmitter. Eliminating a high data rate receiver minimizes power consumption and manufacturing cost, yet the ultra-wideband device can still transmit data quickly, for example, when downloading a video from a camcorder to a computer or television.

As discussed in Applicant's specification (pages 9-11) and in the Scientific American and Microwave Journal articles attached in **Appendix B**, ultra-wideband (UWB) communication technology is "vastly different" from conventional technology that employs substantially continuous carrier waves (quoted directly from the Microwave Journal). However, once UWB is deployed, it will operate alongside conventional narrowband communication technologies. The present invention provides a system that enables communication between ultra-wideband devices at different data rates, while also avoiding interference with devices employing conventional narrowband communication technologies.

(6) Grounds of Rejection to be Reviewed on Appeal

Whether claims 7-20 are unpatentable under U.S.C. § 103(a) as being obvious in light of published U.S. patent application 2003/0189975 ("Fullerton") in view of U.S. patent 5,535,239 ("Padovani").

(7) Argument

As an initial matter, it is noted that according to the Patent Office, a new ground of rejection in an examiner's answer should be "rare", and should be levied only in response to such things as newly presented arguments by Applicant or to address a claim that the examiner previously failed to address, 69 Fed. Reg. 155 (August 2004), see, e.g., pages 49963 and 49980. Furthermore, a new ground of rejection must be approved by the Technology Center Director or designee and in any case must come accompanied with the initials of the conferees of the appeal conference, id., page 49979.

I. Pertinent Law and Prosecution History

In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined), must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure. M.P.E.P. § 2142

A. Prior art does not teach or suggest all claim elements

This most fundamental requirement of a *prima facie* case of obviousness is not met by the cited references, either alone or in combination.

Both of Applicant's independent claims 7 and 16 recite, in part, ". . . transmitting both the first and second data frames in a pseudo-random method."

As admitted by the Examiner, Fullerton is completely silent as to any teaching or suggestion of this claim element. The Examiner cites Padovani, FIGS. 1, 2a-h, 10a-d and col. 16, lines 50-63 and col. 34, lines 43-55 for teaching or suggesting this claim element. However, FIG. 1 simply teaches a transmitter, and col. 16, lines 50-63 teaches "data burst randomizer logic 46" that inserts data **within** each frame. FIGS. 10a-10d are described as "a series of diagrams illustrating data positioning **within the frames** for the various data rates." However, each frame has a fixed time duration, and is not transmitted pseudo-randomly. "The present invention is thus a method and system, for use in a communication system in which data is transmitted **in data frames of a predetermined time duration**. . .A computation circuit computes according to a deterministic code a pseudorandom position for the data **within each data frame**" (col. 2, lines 62-67 and col. 3, line 1). Col. 16, lines 50-63 simply claims this teaching.

Thus, Padovani teaches pseudorandom positioning of data **within each data frame, but not pseudorandom transmission of data frames**. These are two very different concepts, and require a communication device to function in a very different manner. For example, Padovani teaches the very specific timing of transmission of each data frame (see FIG. 10). This is **not** pseudo-random transmission of data frames, and Padovani is not able to transmit or receive pseudo-random data frames. Therefore, Padovani fails to teach or suggest this claim element.

Applicant's independent claim 17 reads as follows:

> An ultra-wideband communication device, comprising:
> a transceiver structured to communicate at a first data rate; and
> a transmitter structured to transmit at a second data rate that is greater than the first data rate.

The Examiner admits that Fullerton fails to teach "a transceiver structured to communicate at a first data rate and a transmitter structured to transmit at a second data rate that is greater than the first data rate. The Examiner then simply cites Padovani, FIGS. 10a-d, as teaching or suggesting these missing claim elements. However, FIGS. 10a-d are described as "a series of diagrams illustrating data positioning within the frames for the various data rates" (col. 3, lines 56-58). No device is illustrated, no transceiver is illustrated, nor is a transmitter illustrated.

Thus, FIGS. 10a-d completely fail to teach or suggest a communication device that includes a transceiver (which comprises a transmitter and a receiver) and also a second transmitter. In fact, the entire Padovani reference fails to teach or suggest a communication device that includes a transceiver and also a transmitter. Therefore, Padovani fails to teach or suggest these claim elements.

In conclusion, neither reference teaches or suggests several of Applicant's recited claim elements found in independent claims 7, 16 and 17, and thus, the most fundamental requirement of a *prima facie* case of obviousness is not met by the cited references, either alone or in combination.

B. No motivation to combine references

The Examiner's third Office Action (mailed August 23, 2006) maintains the Section 103 rejection by combining the two references, Fullerton and Padovani. Because a modification to the prior art is required to support this 35 U.S.C. § 103 rejection, an appropriate motivation to modify

must be set forth in order to establish a prima facie case of obviousness. See, In re Fritch, 972 F.2d 1266 (Fed. Cir. 1992). The Examiner states that in addition to the motivation provided in the previous Office Actions (reproduced below), the motivation can also "be found in the knowledge generally available to one of ordinary skill in the art" (Response to Arguments section).

The above statement that the motivation to combine and modify the prior art to meet the claimed invention is simply "found in the knowledge generally available to one of ordinary skill in the art" is not sufficient to establish a *prima facie* case of obviousness without some objective reason suggested by the prior art (and not by the Examiner) to combine the teachings of the references (see M.P.E.P. §2143.01, first, second, and seventh paragraphs). "Broad conclusory statements regarding the teaching of multiple references, standing alone, are not evidence", In re Dembiczak. 175 F.3D 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999). As set forth in Dembiczak, "the best defense against the subtle but powerful attraction of hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references", Id. at 999,50 U.S.P.Q.2d at 1617.

Therefore, the Examiners bald assertion that the motivation to combine is simply "found in the knowledge generally available to one of ordinary skill in the art" is contrary to established Federal Circuit law and several sections of the M.P.E.P.

In the first Office Action, the motivation to combine provided by the Examiner, and still maintained in the third Office Action, is a cite to Padovani (col. 2, lines 45-48). Specifically, the Examiner states:

> "It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Fullerton by using the features, as taught by Padovani et al, in order to provide an efficient data communication system by reducing within transmission data frames of various users the occurrence of

unnecessary instances of contemporaneous transmission of data **so as to reduce systemwide traffic loading** in data transmission" (emphasis added).

Padovani is concerned with traffic loading (*i.e.*, data traffic or loads) because Padovani teaches CDMA cellular communications (col. 4, lines 12-15). The maximum data traffic rates taught in Padovani's cell phone system is 9.6 kilobits per second (col. 4, lines 31-33). That is, 9,600 bits per second. With these low data rates, the Padovani cell phone system can become easily overloaded, which is why reducing data traffic load is the focus of his invention.

In contrast, Fullerton is concerned with the problem of self-interference in an ultra-wideband impulse radio transmitter (see Abstract). This is because Fullerton teaches transmitting millions of discrete pulses of electromagnetic energy, each having a duration of 0.1 nanoseconds (page 3, para. 0049). Fullerton teaches that this new technology is capable of carrying "thousands of voice channels per cell" (page 5, para. 0088). The Scientific American article in **Appendix B** discusses the incredible data rates achievable by ultra-wideband ("UWB") technology. Specifically, UWB is cited as achieving data rates of 100 to 500 Mega Bits per second. That is, 500,000,000 bits per second, **which is a data rate 5,200 times greater than taught in Padovani.** Applicant's specification (on page 10, lines 18-20) teaches data traffic rates of 100 Mega Bits per second or greater.

Obviousness requires proof "that the skilled artisan. . .would select the elements from the cited prior art references for combination in the manner claimed", In re Rouffet. 149 F.3D 1350, 1358 (Fed. Cir. 1998). Knowing that ultra-wideband technology is capable of previously unimaginable data traffic rates, why would the skilled artisan (like Fullerton) be concerned with reducing data traffic load? Moreover, Fullerton contains no teaching or suggestion of a need to

reduce data traffic loads. This is because Fullerton's ultra-wideband technology is totally unconcerned with data traffic loads, due to the tremendous data capacity of the technology.

Finally, M.P.E.P. §2143 requires that the "prior art suggest the desirability of the combination." As Fullerton is utterly unconcerned with data traffic loads, the Examiner's stated motivation to combine references is completely illogical, and therefore can only be based on the Examiner's improper hindsight, which is contrary to case law and the M.P.E.P.

C. No reasonable expectation of success

The CAFC recently stated that "one predicate to a finding of obviousness: that a person of ordinary skill in the art would have had a 'motivation to combine' the prior art to achieve the claimed invention and would have had a 'reasonable expectation of success' in doing so." Alza Corp. v. Mylan Laboratories, Inc., Case No. 06-1019 (Fed. Cir., Sept. 6, 2006)

And the M.P.E.P. § 2143.01 states: "if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teaching of the references are not sufficient to render the claims *prima facia* obvious." It follows that if the principal of operation of the prior art is modified, there can be no reasonable expectation of success.

The Examiner proposes to modify Fullerton to incorporate features taught in Padovani.

As discussed above, Fullerton teaches transmitting millions of discrete pulses of electromagnetic energy, each having a duration of 0.1 nanoseconds (page 3, para. 0049). The pulses are "interleaved" so as to avoid self-interference between transmitted and received pulses (see Abstract). As shown in FIG. 1B, each pulse occupies several Giga Hertz of radio frequency. Thus, a

Fullerton receiver is designed to receive and process millions of discrete electromagnetic pulses that each occupy a radio frequency band of several Giga Hertz.

In contrast, Padovani is concerned with traffic loading in CDMA cellular communications (col. 4, lines 12-15). In the United States, cell phones use 25 Mega Hertz of radio frequency band (between 800 and 900 MHz) to receive a continuous sinusoidal carrier wave that is modulated with data (i.e., the caller's voice).

So in summary:

Fullerton teaches transmitting and receiving millions of discrete nanosecond pulses that each occupy a radio frequency band of several Giga Hertz.

Padovani teaches transmitting and receiving a continuous sinusoidal carrier wave that is 25 Mega Hertz wide.

Modifying Fullerton to use a continuous sinusoidal carrier wave requires a complete and total change to Fullerton's principal of operation. Put differently, a skilled artisan, reviewing the teachings of Fullerton, would not have been motivated to modify Fullerton to use conventional communication technology as taught in Padovani. This is because Fullerton teaches a very specific communication technique tailored to ultra-wideband communication technology (*i.e.*, "pulse interleaving"). **Pulse interleaving is impossible to implement in conventional communication technology** (as employed by Padovani).

Applicant's specification (FIGS. 1-2, and pages 9-11), and the two articles in **Appendix B** discuss the tremendous differences between conventional communication technology and ultra-wideband technology. "The technology is vastly different from classical radio transmission." Bruno Pattan, *A Brief Exposure to Ultra-Wideband Signaling*, Microwave Journal, (December 2003).

"UWB technology is radically different" than familiar forms of radio communications. David G. Leeper, *Wireless Data Blaster*, Scientific American, 64, 69 (May 2002).

The M.P.E.P. and case law requires that the motivation to combine references must be supplied by the references themselves. "[T]he best defense against the subtle but powerful attraction of hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references", In re Dembiczak. 175 F.3D 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999).

However, in this case, the Examiner proposes to combine completely different technologies that operate in a fundamentally different manner. Therefore, there is absolutely no reasonable expectation of success, and the required motivation can only come from improper hindsight reconstruction.

Conclusion

For all of the reasons set forth above, Applicant respectfully submits that the rejection of claims 7-20 should be reversed. A Notice of Allowance is earnestly solicited.

Respectfully submitted,

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APPENDIX A - APPEALED CLAIMS

1. (withdrawn) An ultra-wideband communication method, the method comprising the steps of:

determining a radio frequency band for communication;

mapping any electromagnetic signals present in the determined radio frequency band; and

transmitting a plurality of ultra-wideband pulses in the determined radio frequency band.

2. (withdrawn) The method of claim 1, wherein the step of mapping electromagnetic signals comprises analyzing any electromagnetic signals present in the determined radio frequency band.

3. (withdrawn) The method of claim 1, further comprising the step of transmitting a plurality of ultra-wideband pulses in another radio frequency band if transmitting in the determined radio frequency band would cause substantial interference to any electromagnetic signals present in the determined radio frequency band.

4. (withdrawn) The method of claim 1, wherein the determined radio frequency band may range from about 1 gigahertz to about 10 gigahertz.

5. (withdrawn) The method of claim 1, wherein each of the plurality of ultra-wideband pulses has duration that ranges from about ten picoseconds to about one millisecond.

6. (withdrawn) A ultra-wideband communication method, the method comprising the steps of:

means for determining a radio frequency band for communication;

means for mapping any electromagnetic signals present in the determined radio frequency band; and

means for transmitting a plurality of ultra-wideband pulses in the determined radio frequency band.

7. (original) An ultra-wideband communication method, the method comprising the steps of:

generating a first data frame, constructed to transmit data at a first data rate;

generating a second data frame, constructed to transmit data at a second data rate; and

transmitting both the first and second data frames in a pseudo-random method.

8. (original) The method of claim 7, wherein the pseudo-random method comprises transmitting the first and second data frames so as to substantially avoid generating a spectral line.

9. (original) The method of claim 7, wherein the pseudo-random method comprises transmitting the first and second data frames by using a pseudo-random timing sequence.

10. (original) The method of claim 7, wherein the first and second data frames each comprise a plurality of time bins, with each time bin capable of receiving an ultra-wideband pulse.

11. (original) The method of claim 7, wherein the first data frame transmits data at a rate that ranges between about one kilobit per second to about five megabits per second.

12. (original) The method of claim 7, wherein the second data frame transmits data at a rate that ranges between about five megabits per second to about one gigabit per second.

13. (original) The method of claim 7, wherein the second data frame transmits data at a rate selected from a group consisting of: a 25 megabit per second rate, a 50 megabit per second rate, a 100 megabit per second rate, a 200 megabit per second rate, a 400 megabit per second rate, a 480 megabit per second rate, a 500 megabit per second rate, and a one gigabit per second rate.

14. (original) The method of claim 7, wherein the first and second data frames each comprise a time duration that may range from about one microsecond to about one millisecond.

15. (original) The method of claim 7, wherein the first and second data frames each comprise a plurality of time bins, with each time bin capable of receiving an ultra-wideband pulse, wherein the ultra-wideband pulse may range in duration from about 10 picoseconds to about one nanosecond.

16. (original) An ultra-wideband communication method, the method comprising the steps of:

means for generating a first data frame, constructed to transmit data at a first data rate;

means for generating a second data frame, constructed to transmit data at a second data rate; and

means for transmitting both the first and second data frames in a pseudo-random method.

17. (original) An ultra-wideband communication device, comprising:

a transceiver structured to communicate at a first data rate; and

a transmitter structured to transmit at a second data rate that is greater than the first data rate.

18. (original) The ultra-wideband communication device of claim 17, wherein the transceiver communicates by receiving and transmitting at the first data rate, and the transmitter transmits at the second data rate.

19. (original) The ultra-wideband communication device of claim 17, wherein the first data rate transmits data at a rate that ranges between about 1 kilobit per second to about 5 megabits per second.

20. (original) The ultra-wideband communication device of claim 17, wherein the second data rate transmits data at a rate that ranges between about 5 megabits per second to about 1 gigabit per second.

APPENDIX B - EVIDENCE

Bruno Pattan, *A Brief Exposure to Ultra-Wideband Signaling*, Microwave Journal, (December 2003).

David G. Leeper, *Wireless Data Blaster*, Scientific American, 64, 69 (May 2002).